



# Meeting Federal Reporting Requirements

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# Presentation



- Overview of Reporting Requirements
- Changes in WV data architecture and model
- Reporting challenges
- Data challenges
- Tools and methods for reporting assistance
- Remaining challenges



# Reporting Requirements



- **Highway Performance Monitoring System (HPMS)**
  - 2014 HPMS Field Manual updates
  - 2010 Reassessment - 2013 impacts
- **Fundamental Data Elements (FDE)**
  - Portion of Model Inventory of Roadway Elements (MIRE)
  - Primarily Intersections and Ramps
- **MAP-21 Legislation**
  - Include all local roads in Federal reporting (ARNOLD/TFTN)
  - Performance measures (HSIP, NHPP, Asset Mgmt, NFN, CMAQ, etc.)
  - Changes still coming...



# Reporting Requirements



- WVDOT Requirements
  - Internal safety group pushing for all MIRE attributes
  - Asset Management effort supporting a portion MIRE attributes. Need to integrate with Roads and Highways.
  - Interface to Deighton dTIMS data.
  - Interface to Transmetric traffic data.
  - Certified mileage for State of West Virginia.
  - Existing legacy systems with specific data format needs.





# Changes in WV Data Architecture



- LRS and road inventory maintenance are currently in independent data systems and merged for analysis and reporting...moving to Esri R&H.
- External use of LRS for the WV Enterprise Resource Planning (ERP) project - wvOASIS.
  - AgileAssets for asset management
  - Assets maintained outside of core WVDOT GIS group
- Leveraging a County and Statewide route designation for all centerlines. Statewide LRM primary LRM of Asset Management project.



# Changes in WV Data Modeling



- Normalized data/table structures.
  - Fewer attributes per table
  - Many more tables
- More lookup/domain tables to help with data quality.
- Fewer “keys” between multiple tables.
  - Depend more on spatial and linear relationships
  - Less confusion for data users/maintainers
- Migration pains from ArcGIS > Rome > R&H 10.2



# Reporting Challenges



- New specifications for data elements.
  - FDE data elements
  - MIRE elements for safety
- Tools not readily available for reporting.
- New data model allowing for the MIRE attributes, but need to define data reports/views/exports to leverage the data.
- Bringing multiple business units' data together to facilitate reporting and analysis.



# Data Challenges



- Not all needed data exists in the DOT.
- Much larger quantity and scope of data.
- Normalized data is easier to maintain, but more challenging to combine for reporting.
- DOT, MIRE, and HPMS data elements not all the same definition.
  - Functional class
  - Shoulder definitions
  - Surface types
  - and many more...



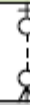


# Meeting the Challenges



- Adjusting the data model to accommodate the added attribution.
- Defining good solid data and system architectures for the larger data quantities.

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	D_FUNCTIONAL_CLASS_DESC SYSTEM_CREATE_DATE SYSTEM_MOD_DATE SYSTEM_RETIRE_DATE USER_CREATE USER_MOD



FUNCTIONAL_CLASS	
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FK1	D_FUNCTIONAL_CLASS_ID
FK2	D_HPMS_FUNCTIONAL_CLASS_ID
	FIELD_ESTABLISH_DATE FIELD_RETIRE_DATE SYSTEM_CREATE_DATE SYSTEM_MOD_DATE SYSTEM_RETIRE_DATE USER_CREATE USER_MOD



D_HPMS_FUNCTIONAL_CLASS	
PK	<u>D_HPMS_FUNCTIONAL_CLASS_ID</u>
	D_HPMS_FUNCTIONAL_CLASS_DESC SYSTEM_CREATE_DATE SYSTEM_MOD_DATE SYSTEM_RETIRE_DATE USER_CREATE USER_MOD



# Meeting the Challenges



- Locating or developing tools to facilitate the reporting of the data.
- Integrate reporting tools with the data environment.
- Identifying methods for deriving values from existing attributes and GIS (e.g. intersections).

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TOTAL									
NHS									

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# Tools for Reporting



- Dynamic segmentation tools – provide more robust dyn seg query tools.
- Key generators – segment business data at HPMS sample segments and store sample ids for easier table joins (published vs. transactional).
- Statistical segmentation tools – generate “predominant” and “weighted average” values during dyn seg.
- Automated intersection data model population for FDE requirements.



# Reporting Data Architecture



- Publish views and “materialized views” for data analysis and reporting.
- Leverage data temporality in R&H to assist with integrating appropriate data.
- Leverage R&H REST services for syncing external business data with the LRS.
  - AgileAssets – LRS Export and Relocate Event services
  - Deighton dTIMS – Relocate Event services
  - Transmetric Traffic Server – Relocate Event services





# Ongoing Challenges



- Aligning the DOT, HPMS, MIRE data definitions...or not.
  - Carry multiple fields for the different needs?
  - Determine if DOT fields can be deprecated over time.
  - Accommodating changes from Federal mandates.
- Aligning the needs of the ERP and Federal report requirements.
- Staffing and skills.



# Many thanks...



- West Virginia DOT
  - Hussein Elkhansa
  - Yueming Wu
  - Marshall Burgess
  - Kyle Weatherholt
- Transcend Spatial Solutions
  - Jesse Jay
  - Bryan Kelley
  - Kristi Barry
  - Andréa Compton



Questions??



# Thanks!

# Safe Travels!

